

(12) UK Patent Application (19) GB (11) 2 130 082 A

(21) Application No 8330679
(22) Date of filing 17 Nov 1983

(30) Priority data

(31) 3242615

(32) 18 Nov 1982

(33) Fed. Rep. of Germany (DE)

(43) Application published
31 May 1984

(51) INT CL³

A47L 15/42

(52) Domestic classification
A4F 29A1E3

(56) Documents cited
None

(58) Field of search
A4F

(71) Applicant

Bosch-Siemens
Hausgerate GmbH
(FR Germany),
Hochstrasse 17, 8000
Munchen 80, Federal
Republic of Germany

(72) Inventors

Ernst Stickel,
Hans Mailander,
Hans-Peter Nannt

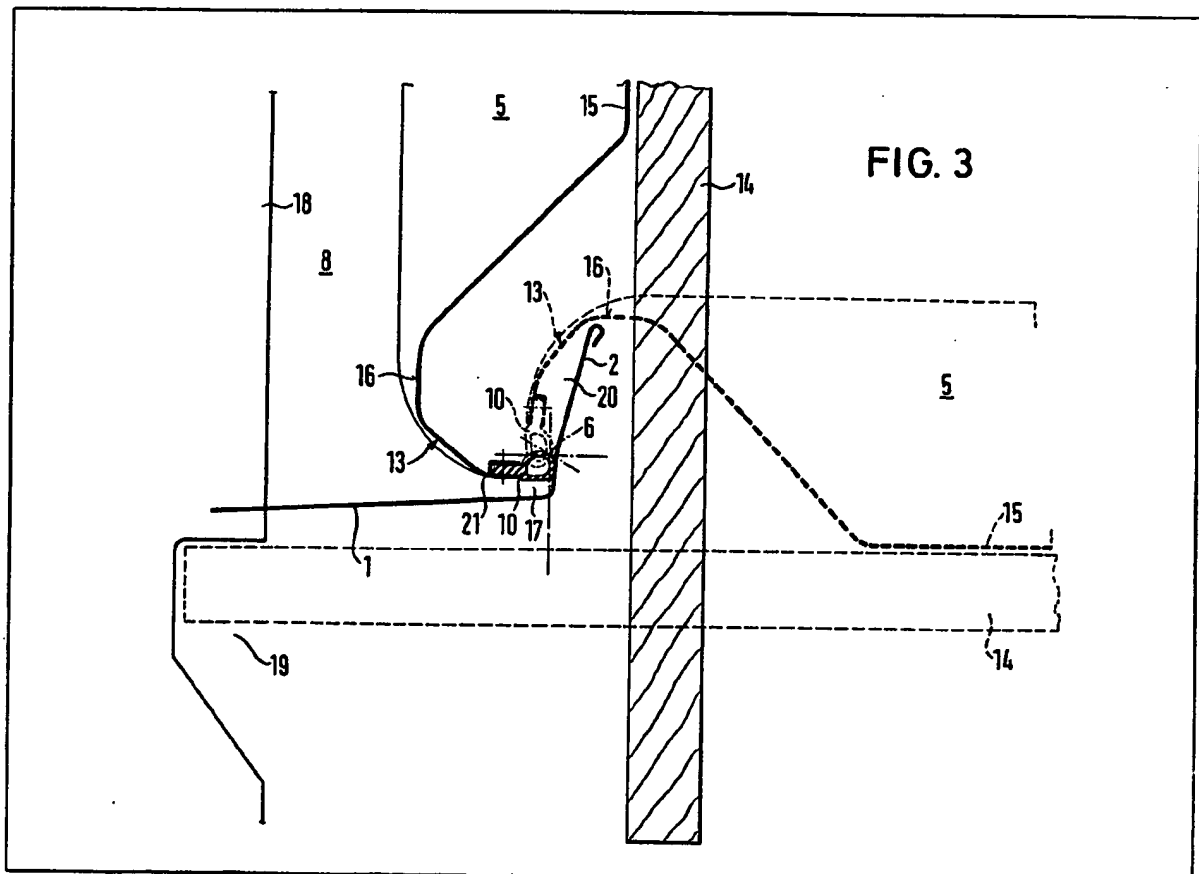
(74) Agent and/or Address for
Service

Dr. Walther Wolff & Co.,
6 Buckingham Gate,
London SW1E 6JP

(54) Door sealing in a dishwashing
machine

(57) A dishwashing machine
comprises a rinsing container (8) with
a skirt portion (2) bounding the lower
edge of a side access opening of the
container and a door pivotable about
an axis (6) to open and close the

access opening, the door comprising
an inner door element (5) having an
arcuate lip portion (13). For sealing of
the door relative to the skirt portion
and avoidance of a visible dirt
accumulation at the latter, the lip
portion engages over the skirt portion
and is provided at its free end with a
seal (10) which bears against the skirt
portion when the door is closed. When
the door is open, the lip portion and
seal cover the skirt portion to such an
extent as to preclude deposition of dirt
on the skirt portion.



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FIG. 1

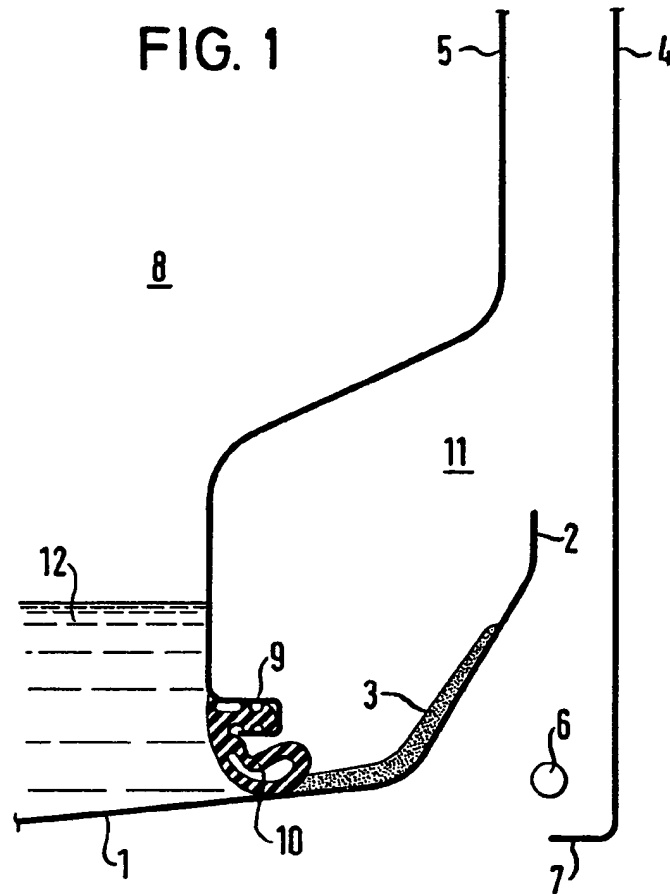
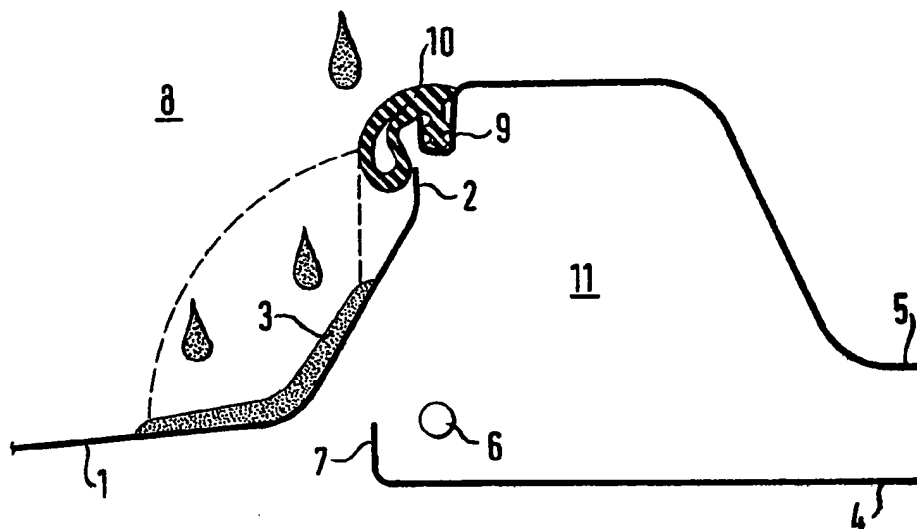


FIG. 2



SPECIFICATION

Door sealing in a dishwashing machine

The present invention relates to a dishwashing machine and has particular reference to door sealing in such a machine.

In German (Fed. Rep.) Utility Model No. 70 17 821 there is disclosed a dishwashing machine with a front side door, which is double-walled and in which a seal of rubber-elastic material is arranged between a rinsing container of the machine and the inside wall of the door. The strip is approximately U-shaped in cross-section, extends over the entire width of the door and is fastened at one limb to the inside wall of the door and at its other limb to a skirt of the rinsing container, while the portion of the sealing strip between the limbs extends arcuately into the hollow space between the inside wall and the outside wall of the door. In that case, the outside door wall extends down over a pivot axis of the door and this axis is disposed high above the rinsing container base. In this dishwashing machine, which in the absence of a pedestal recess in the machine is not able to be clad with an attachment plate projecting beyond the lower edge of the door, dirt can drip onto the skirt during loading of the crockery baskets, deposit in the upper skirt portion and in the course of time form a dirt zone which, during each loading and unloading of the machine, is fully in the field of view of the operator. Since the machine cannot be clad with furniture attachment doors of kitchen cupboards, an installation, which is adapted in appearance to kitchen furniture, of the machine into a kitchen furniture line is excluded.

In another known dishwashing machine (FR-OS 24 97 653), the door is provided with an attachment plate projecting into a pedestal region and mounted to be pivotable about a horizontal axis which extends in the region of the transition of the rinsing container base to the skirt, wherein the vertical plane of the pivot axis lies externally of the rinsing container at a spacing in front of the skirt. An inside element of the door has a lower slightly curved lip provided at its rim with an annular sealing strip which in the closed setting of the door lies against the transition of the rinsing container base to the skirt and in the open setting of the door at the upper skirt rim. It has been found that in the open setting of the door, the skirt portion between the upper rim and the transition to the rinsing container base lies free so that a dirt zone, which cannot be carried away by the rinsing liquid and lies in the field of view of the operator, forms on this skirt portion.

For the cleaning of the dirt zone between the rinsing container skirt and the inside wall of the door of a dishwashing machine, DE-OS 30 29 032 provides, in a gap formed between the skirt and the inside wall of the door and extending over the width of the door, at least one jet spraying the skirt and the door inside wall in the region of the gap as well as a drainage opening from the gap to the rinsing container. This construction is

expensive and does not make possible a pedestal recess in the bottom region of the rinsing container as would be required for the pivoting-in of a decorative door plate.

Finally, it has been proposed to provide a dishwashing machine, which has with a pedestal recess starting underneath the base of the rinsing container and a door, which is mounted at the machine body in the region of its bottom side portion above the pedestal recess to be pivotable about a horizontally extending axis and which is clad by an attachment plate projecting into the region of the recess, the pivot axis of the door being disposed at the height of the rinsing container base. The recess is formed directly below the rinsing container base and an attachment plate is arranged to lie at least indirectly against the door (German patent application P 31 04 894.3). A gear, which during the opening of the door constrains a pivotal movement of the attachment plate in advance of and relative to the door, is superfluous and the unit of door and attachment plate consequently simplified. Since the lower rim of the inside door element is constructed to be short, this rim is hardly capable of covering the front side skirt rim of the container base in the open setting of the door so that food remnants falling from the crockery during the charging of the dishwashing machine land in the space between the outside door element and the inside door element. In order to avoid this, the lower rim of the inside door element is provided with a flap which is dragged along during movement of the door and in the open setting of the door covers the gap between this rim and the skirt rim. In spite of the additional effort caused by the drag flap, the dirt zone arising in the skirt region is again disposed in the range of view of the operator.

There is therefore a need for a dishwashing machine in which the build-up of a dirt layer as described in the foregoing is reduced and in which any such layer is in any case screened from the view of the operator, especially a machine which, through an attachment plate fastenable to the outside of the door, is adaptable in appearance to adjoining kitchen furniture units.

According to the present invention there is provided a dishwashing machine comprising a housing, a rinsing container arranged in the housing and having an access opening at one side of the housing and a skirt portion extending upwardly from the base of the container to the region of the lower edge of the access opening, and a door which is mounted on the housing to be pivotable about a substantially horizontal axis disposed in front of the skirt portion and in the region of the level of the container base and to be movable between a closed and an open position respectively closing and opening the access opening and which has a lower lip portion arranged to engage over the skirt portion in the open and closed positions of the door, the lip portion being provided at its free end with a sealing element arranged to bear against the skirt

portion, with a gap to the container base, in the closed position of the door, and the lip portion and the sealing element being arranged to cover the skirt portion, apart from a portion thereof in the region of such gap, in the open position of the door.

It is advantageous in such a machine that an additional part, such as a drag flap or the like, is not needed and any dirt layer, which may still arise at the lower region of the skirt portion over a longer period of time, does not lie in the range of view of the operator. With the door closed, the sealing of the interior space of the rinsing container is ensured through the sealing element which is fastened to the lip portion and, as a prolongation thereof, presses against the skirt portion.

Preferably, the door pivot axis extends through the container interior in the proximity of the skirt portion and at a distance above the container base equal or close to the height of said gap. Through this arrangement of the axis in conjunction with the construction of the lip and skirt portions, the covering of the skirt portion by the lip portion and sealing element in the open position of the door and the screening at the same time of any dirt zone possibly arising on the skirt portion are facilitated. In addition, the skirt portion can be drawn upwardly to sufficient height and any cover or attachment plate mounted on the door need enter only slightly into a recess provided for this purpose on the machine housing.

Through the formation of the aforesaid gap, it is ensured that the zone of the rinsing container base disposed below the sealing element is constantly cleaned and rinsed by rinsing water, so that any formation of a dirt strip on the skirt portion is confined to the region above the sealing location, where such a strip would not be visible to the operator.

An embodiment of the present invention will now be more particularly described by way of example with reference to the accompanying drawings, in which:

Fig. 1 is a schematic sectional view of the mounting region of a known double-walled dishwashing machine door, showing the door in a closed setting;

Fig. 2 is a view similar to Fig. 1 but showing the door in an open setting; and

Fig. 3 is a schematic sectional view of the door mounting region in a dishwashing machine embodying the present invention, wherein the closed setting of the door is shown in solid lines and the open setting in dashed lines.

Referring now to the drawings, for a demonstration of the state of the art, Figs. 1 and 2 show how a dirt zone 3 can form in the region of the transition from the base 1 of a rinsing container in a dishwashing machine (not shown in more detail) to a skirt 2 of the container, which downwardly bounds a front side charging opening of the container. A door for closing the opening consists of an outer element 4 and an inner element 5 and is pivotable about a horizontal axis

6 between a closed setting and an open setting. The axis 6, formed by mounting blocks secured to the housing, is disposed in height in the region of the transition of the base 1 into the skirt 2 and is arranged at a spacing in front of the skirt externally of the rinsing container. The element 4, which is planar in vertical plane, has a lower rim 7 which covers the region of the axis 6, whilst the element 5, which extends inwardly in the lower region into the rinsing container interior space 8, carries a rubber or synthetic material skirt seal 10 at its lower rim 9, while the skirt 2 projects into a downwardly open space 11 between the inner and outer elements 4 and 5.

In the closed position of the door, the seal 10 lies against the base 1 and prevents the transfer of the rinsing liquid 12 behind the sealing location to the skirt 2. Equally, however, the detaching and rinsing away of a dirt zone 3 behind the sealing location is prevented. The build-up of this dirt zone 3 arises, according to Fig. 2, particularly during the charging of the dishwashing machine, as dirt and food remnants can fall into the free-lying skirt 2 when the door is open. During the cleaning and rinsing steps of the dishwashing machine, these dirt deposits cannot be carried away by the rinsing liquid when the door is closed. Since the dirt zone 3 on the skirt is disposed, in the open setting of the door, fully in the field of view of the operator, the cleaning quality of the machine is judged negatively.

In the dishwashing machine embodying the invention as shown in Fig. 3, the inner door element 5 — the outer door element is not illustrated — is provided at the end of its lower side portion 16 with an arcuately bent door lip 13, which extends so far into the rinsing container that, in both the open and the closed setting of the door, it engages over the skirt 2 almost over its entire height. The attachment plate 14 lies against the outer door element arranged in front of the inner door element 5 and is fastened thereto. The attachment plate 14 consists of, for example, wood and particularly serves for adaptation of the machine front to the appearance and the pedestal height of adjoining kitchen cupboards.

The seal 10 in this case constitutes a resilient prolongation of the door lip and bears tightly against the skirt 2 in the closed setting of the door, the seal being fastened to the lower end edge 21 of the lip 13. When the door is opened, the lip 13 and the seal 10 cover the skirt 2 to such an extent that the skirt is protected from dirt deposition thereon and is screened from the field of view of the operator. Considered in the closed position of the door, the element 5 passes over from an upper vertical, planar portion 15 in a circular or spiral arc, extending over about 90°, into the lip 13. During the opening travel of the door, the spirally arcuate lip is movable contactlessly over the skirt 2. The bearing axis 6 of the door in that case lies in a horizontal plane, which extends somewhat above the transition between the rinsing container base 1 and the skirt 2, and in a vertical plane which extends within the rinsing container skirt

space 20.

In order that the rinsing container base 1, as far as the skirt 2, can be rinsed free by the rinsing liquid of any dirt accumulations, the seal 10 lies
5 against the skirt above the rinsing container base by a gap 17 when the door is closed.

The machine body, which is formed by a frame, is indicated by 18 and in its lower region has a pedestal recess 19 into which the attachment
10 plate 14 is pivotable when the door is opened.

CLAIMS

1. A dishwashing machine comprising a housing, a rinsing container arranged in the housing and having an access opening at one side
15 of the housing and a skirt portion extending upwardly from the base of the container to the region of the lower edge of the access opening, and a door which is mounted on the housing to be pivotable about a substantially horizontal axis
20 disposed generally in the vicinity of the skirt portion and the container base and to be movable between a closed and an open position respectively closing and opening the access opening and which has a lower lip portion
25 arranged to engage over the skirt portion in the open and closed positions of the door, the lip portion being provided at its free end with a sealing element arranged to bear against the skirt portion, with a gap to the container base, in the

30 closed position of the door, and the lip portion and the sealing element being arranged to cover the skirt portion, apart from a portion thereof in the region of such gap, in the open position of the door.

35 2. A dishwashing machine as claimed in claim 1, wherein the door comprises an inner door element, an outer door element, and a cover member mounted on the outer element, the lower lip portion being provided on the inner door
40 element and the cover member being arranged to project into a recess in the housing below the rinsing container in the open position of the door.

3. A dishwashing machine as claimed in either claim 1 or claim 2, wherein the door pivot axis
45 extends through the container interior in the proximity of the skirt portion and at a distance above the container base equal or close to the height of said gap.

4. A dishwashing machine as claimed in any
50 one of the preceding claims, wherein the lip portion extends on a generally circularly or spirally arcuate path through an angular range of substantially 90° and adjoins a planar portion of the door, the sealing element being arranged to
55 extend from the lip portion in the manner of a resilient prolongation thereof.

5. A dishwashing machine substantially as hereinbefore described with reference to Fig. 3 of the accompanying drawings.